REMARKS

In the Final Official Action dated October 4, 2005, the Examiner rejected Claims 1-6 under 35 U.S.C. §103(a) as allegedly being not patentable over U.S. Patent No. 6,103,392 to Dorfman et al. ("Dorfman et al."). In addition, the Examiner rejected Claims 1-6 under 35 U.S.C. §103(a) as allegedly being not patentable over U.S. Patent No. 5,686,676 to Jech et al. ("Jech et al.").

This response addresses the Examiner's rejection. Accordingly, it is respectfully submitted that the present application is in condition for allowance. Favorable consideration of all pending claims is therefore respectfully requested.

Claims 1-6 have been cancelled without prejudice. Applicants have not abandoned the subject matter as recited in these claims and reserve the right to file this subject matter in the present application at a later time or in a continuation application.

New Claims 7-12 have been added to the present application. These new claims are supported by the underlying specification. New Claim 7 has support in original Claims 1 and 3, and on page 7 of the specification, while Claim 9 is supported by original Claims 2 and 3 and page 7 of the instant specification. New Claims 8 and 10 have support in original Claims 5-6, and on page 8 of the specification, and Claim 11 and 12 are supported by original Claim 3. Entry of this amendment is respectfully requested.

Claim 7 relates to a sintering method for a W-Cu composite material without exuding of Cu comprising the steps of preparing a W-Cu composite powder from $WO_3/WO_{2.9}$ powder and CuO/Cu_2O powder; compacting the W-Cu composite powder to a W-Cu composite material; densifying the W-Cu composite material by holding the W-Cu composite material at a temperature of abut 800 to about 1083°C under a reduction atmosphere; and sintering the W-Cu

composite material at a temperature ranging from about 1200 to about 1400°C without an isothermal hold. In Claim 9, the densifying step is carried out at a temperature ranging from about 1083 to about 1150°C under a reduction atmosphere.

No new matter has been added to the application.

Pursuant to the first rejection of the claims under 35 U.S.C. §103, the Office Action cites Dorfman et al.

Dorfman et al. allegedly disclose a process for forming a homogenous W-Cu pseudoalloy comprising pressing a tungsten-coated copper composite powder to form a compact and sintering the compact. More specifically, Dorfman et al. disclose a method for forming the tungsten-coated copper composite particle which involves the hydrogen reduction of a W-Cu composite oxide powder containing $CuWO_4$ and WO_3, followed by consolidation of the W-Cu composite powder. The consolidated powder next undergoes sintering in which 0.5 wt% of an organic lubricant was blended with the W-Cu composite powder to impart pressibility. According to Dorfman et al., the powder compacts were sintered under flowing dry hydrogen in a molybdenum tube inside a high temperature laboratory furnace having automated control of the heating cycle. The sintering cycle consisted of a combination of temperature increases and isothermal holds. As described in column 13, line 6 of Dorfman et al., a temperature rate increase of 10°C/min was used between 120 minute isothermal holds at 850, 950, 1050, 1200 and 1250C.

There are several differences between the present process and the process described in Dorfman et al. For example, in the present process, there are two heating steps. The first heating step requires densifying the W-Cu composite material by holding the W-Cu composite material at a temperature of about 800°C to 1083°C under a reduction atmosphere, as

recited in Claim 7 or at 1083 to 1150°C as recited in Claim 9 and then sintering the W-Cu composite material at a temperature ranging from about 1200 to about 1400°C without an isothermal hold. In contrast, Dorfman et al. disclose the sintering step in which there is a temperature increase rate of 10°/minute between 120 minute isothermal holds at 850, 950, 1050, 1100, 1150, 1200 and 1250°C. Thus, Dorfman et al. teach or disclose an isothermal hold at two temperatures between 1200 and 1400°C, viz., 1200 and 1250°C. In this respect, Dorfman et al. teach away from the present invention by requiring isothermal holds at 1200 and 1250°C.

In addition, the claimed invention is further distinguishable from Dorfman et al. in that Dorfman et al. do not disclose or suggest that the starting material is prepared from mixing $WO_3/WO_{2.9}$ and CuO/Cu_2O. In accordance with the present invention, the W-Cu composite powder is made from $WO_3/WO_{2.9}$ and CuO and Cu_2O. In contrast, Dorfman et al. disclose the composite powder to be comprised of $CuWO_4$ and nWO_3 which is prepared from Cu_2O and precipitated APT (angular particle morphology) and Cu_2O and spray-dried AMT (spherical particle morphology). The $WO_3/WO_{2.9}$ and CuO/Cu_2O starting materials in the claimed invention result in a different type of copper bleed-out in the W-Cu composite system, which is caused by W grain growth during particle rearrangement in a liquid state sintering stage. See page 2, lines 4-18 of the present specification. In contrast, Dorfman et al. disclose that the copper bleed-out is caused by local densification during solid-state sintering. See column 3, lines 58 to column 4, line 10 of Dorfman et al. Thus, the causes of the cooper bleed-out in the present invention and in Dorfman et al. are not only different but the conditions for effecting the copper bleed-outs are entirely different and unrelated.

Thus, contrary to the allegations in the Office Action, the sintering methodology of Dorfman et al. does not substantially overlap with the steps of the present invention. On the

contrary, the present process is not taught or disclosed or suggested by Dorfman et al. Thus, the present process as recited in Claims 7-12 is patentable over the teachings of Dorfman et al. Therefore, the rejection of the claimed subject matter under 35 U.S.C. §103 over Dorfman et al. is overcome and withdrawal thereof is respectfully requested.

Pursuant to the second rejection of Claims 1-6 under 35 U.S.C. §103, the Office Action cites Jech et al. Jech et al. disclose a sintering regimen involving, inter alia, heating a green compact (formed from copper and tungsten containing particles, chemically bound oxygen and an organic binder as described in column 8, lines 52-64), at a temperature ranging from room temperature to about 1050°C over an hour, maintaining the temperature of the compact at 1050°C to 1250°C for about 50 minutes, and then decreasing the temperature of the composite so formed back down to room temperature over an additional 50 minutes. See Column 9, lines 46-54 in Jech et al.

There are many differences between the process described in Jech et al. and the present process. For example, Jech et al. do not suggest or disclose the two heating steps recited in steps (c) and (d) of Claims 7 and 9, which require densifying the composite material by heating the W-Cu composite material at 800°C to 1083°C under a reduction atmosphere, as recited in Claim 7 or at 1083°C to 1150°C as recited in Claim 9 and then sintering the W-Cu composite material at a temperature ranging from about 1200°C to about 1400°C without an isothermal hold. In Jech et al., the second heating step occurs at a temperature maintained between 1050°C and 1250°C. In other words, there is an isothermal hold in that region. See, for example, Examples 1 and 5 where the temperature of the second heating step is maintained at a termpature of 1140°C and Example 2-4 wherein the temperature of the second heating step is maintained at 1210°C. Thus, in Jech et al., the second heating step is conducted at a temperature

which is less than the temperature of the second heating step of the present process or if it is above 1200°C, it has an isothermal hold between 1200 and 1250°C. To that extent, Jech et al. teach away from the present process.

Jech et al. also do not disclose or suggest mixing $WO_3/WO_{2.9}$ powder and CuO/Cu_2O powder for forming a tungsten copper composite powder as required in the claimed invention. They utilize metallic tungsten powder or WO_3 or WO_4 or metallic copper powder or copper oxide. See column 3, line 35 to column 5, line 3 of Jech et al. As indicated on column 4, lines 50-60 of Jech et al., the preferred embodiment utilizes as the raw material copper oxide and tungsten metal. See also Examples 1 and 2 of Jech et al. Thus, Jech et al. do not teach or disclose or suggest the $WO_3/WO_{2.9}$ and CuO/Cu_2O starting materials, which as indicated hereinabove, results in a different type of copper bleed out in the W-Cu composite system, as described hereinabove.

Thus, contrary to the allegations in the Official Action, the sintering method of Jech et al. does not substantially overlap that of the present process, as recited in Claims 7-12. On the contrary, the present process is not taught, disclosed or suggested by the teachings of Jech et al. Consequently, for the reasons enumerated herein, the present process is patentable over the teachings of Jech et al.

Thus, in view of the foregoing amendments and remarks, it is respectfully submitted that the present application is in condition for allowance, which action is earnestly solicited.

Respectfully submitted,

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